

CLAIMS:

1. A method of manufacturing a phase shift mask blank comprising a transparent substrate and at least one layer of
5 phase shift film thereon,

said method comprising the steps of forming the phase shift film on the substrate and surface treating the phase shift film with ozone water having at least 1 ppm of ozone dissolved therein.

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2. A method of manufacturing a phase shift mask blank comprising a transparent substrate and at least one layer of phase shift film thereon,

said method comprising the steps of forming the phase shift film of a metal silicide oxide, metal silicide nitride or metal silicide oxynitride on the substrate and surface treating the phase shift film with ozone water having at least 1 ppm of ozone dissolved therein.

20 3. A method of manufacturing a phase shift mask blank comprising a transparent substrate and at least one layer of phase shift film thereon,

said method comprising the steps of forming the phase shift film of molybdenum silicide oxide, molybdenum silicide nitride or molybdenum silicide oxynitride on the substrate and surface treating the phase shift film with ozone water having at least 1 ppm of ozone dissolved therein.

30 4. The method of manufacturing a phase shift mask blank of claim 1 wherein said phase shift film changes the phase of exposure light passing therethrough by 180 ± 5 degrees and has a transmittance of 3 to 40%.

5. A method of manufacturing a phase shift mask,
comprising the steps of

forming by photolithography a patterned resist film on
the phase shift film in the phase shift mask blank obtained
5 by the method of claim 1,

etching away the portions of the phase shift mask
which are uncovered with the resist film, and
thereafter, removing the resist film.